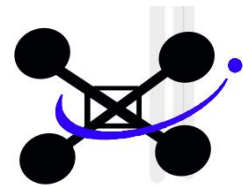


UAV Competition

All You CAN Fly



From 8th to 11th April, 2010



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Lista de Acrónimos

CDR	Critical Design Review
COIAE	Colegio Oficial de Ingenieros Aeronáuticos de España
COITAE	Colegio Oficial de Ingenieros Técnicos Aeronáuticos de España
CONOPS	Concept of Operations
INTA	Instituto Nacional de Técnica Aeroespacial
LCO	Launch Control Officer
LEEM	Laboratorio para Experimentación en Espacio y Microgravedad
MSDS	Material Safety Data Sheet
NAR	National Association of Rocketry
PDR	Preliminary Design Review
RSO	Range Security Officer
TRA	Tripoli Rocketry Association
UPM	Universidad Politécnica de Madrid



1. Introduction to UAV

UAVs: Airplanes, Balloons and X-copters (vehicle with any number of propellers: helicopter, quadricopter, etc.) are three elements of exhibition and competition in the event All You CAN Fly, UAV category.

2. UAV categories

The competition of 2010 for UAV covers the following categories:

2.1 ImWY (I'm Watching You)

This category assesses the aspects of observation and surveillance of a UAV.

The participant teams don't have any restriction according to the observation purposes, but they will have to defend their choice by means of the real capacity of acquisition and data processing.

The UAV will have to be capable of remaining and analyzing a fixed non static area in a specific period of time without direct orders from land.

This time will be defined by $T=500 * t_type$ (in seconds)

The descent and landing of the UAV in autonomous mode will be highly valued.

1. ImWY-A (I'm Watching You - *Airplanes*). Maximum height of 2 Km. Where: $t_type= 2$
2. ImWY-B (I'm Watching You - *Balloons*). Maximum height of 2 Km. Where $t_type = 3$
3. ImWY-C (I'm Watching You – *X-Copter*). Maximum height of 1 Km. Where: $t_type = 1$

2.2 ComeBack UAV

The UAV has to be capable of taking off from a position P1, reaching a height P2 within the ranges (detailed below) during a minimal period of 2 minutes and landing in a position P3. The horizontal distances between every point will be defined by: $X=100*distance_type$ (meters).

1. CB-A (ComeBack – *Airplanes*)

Maximum height of 2 Km. $distance_type = 3$.

2. CB-B (ComeBack – *Ballons*).

Maximum height of 2 Km. $distance_type = 2$.

3. CB-C (ComeBack – *X-Copter*)

Maximum height of 1 Km. $distance_type = 1$

2.3 Scientific Research UAV

This category is conceived with free character for everyone who wants to test certain systems described in the previous categories or scientific experiments of diverse nature. Stratospheric balloons (30-40 Km), amongst others, are considered in this category.

The jury will evaluate the performances of every UAV in the launch field.



3. Design Considerations

The maximum total mass (with engine and fuel) of the UAVs will be 15 Kg. The organization doesn't supply fuel or helium. There will not be distinction of category in regard to engine or number of propellers.

Information about the meteorological conditions in the airfield will be provided by the organization in the web site: <http://fly.leem.es/>.

4. Acceptance revision of UAV

In all the categories of the UAV, an active control from the land, which will control the UAV in case of emergency, will be required.

The participant teams will also have information in real time of the height of the UAV.

If the UAV has an own telemetry system on board, it will be previously calibrated and verified (theoretically and practically) before the day of the flight.

In this case, the organization will contact with the team after analyzing the PDR.

In the case of not having information of telemetry in real time, a payload bay inside the UAV (minimum dimensions: 66mm of diameter and 116mm of depth) will be demanded in order to load the telemetry system provided by the organization (350 grams). In some cases, this requirement can be not applied (as for example, in stratospheric balloons). The organization and the jury, after studying the suggest project, will consider in which UAVs the telemetry system will be load.

All the participant teams will have to send the PDR, explaining the project, before **Sunday 28th February 2010**. The organization and the jury will study the viability of the project and in case of doubts or wrong accomplishment of the work, they will contact with the team. This is the first revision of the project.

If this first test is passed, the project should pass a second test during the afternoon of the first day of competition, which is focused on the construction aspects of the UAV. In the briefing of the competition, the organization will assign the time to every team to carry out the checking of the acceptance revision.

The following aspects will be checked:

- The UAV operates in the allowed frequencies and powers in the rules of the competition.
- The UAV has an active control from the land and this control works properly.
- The UAV has not to be instable.
- At least, the 80% of the mentioned objectives in the CDR have to be set up.

5. Evaluation methods of the projects:

In the case of Airplanes, if the UAV has been developed using an aero model kit, it will be evaluated in a negative way. If the UAV has been designed by the participant team will be highly valued.



The UAV, manufactured by the participant teams, has to work in autonomous mode, but the taking off and landing could be in manual mode.

Nevertheless, if the UAV takes off and lands in autonomous mode will be very highly valued.

Other aspects, as stability during the flight (direction and altitude) will be also value in a positive way.